

ELONGATED ORIFICE CLOSURE

BACKGROUND

5 This invention relates to container closures, and more particularly, to hinged container closures having an opening for dispensing material therethrough.

 Several types of closures for sealing a container for holding and dispensing sauces and other contents are known. For example, a removable closure may be coupled to a container by threads disposed on an interior surface of the closure and
10 mating threads disposed on an exterior surface of the container neck. Unscrewing the closure enables complete detachment of the closure from the container and easy dispensing from an opening in the container. The drawbacks of the fully-removable closure include potential loss or soiling of the closure while it is detached, the requirement of two hands to operate the closure, and a generally inconvenient opening
15 process compared with some other closures. Further, in some circumstances, the container contents may adhere to the underside of the closure and eventually coat the threads, which is unattractive, unsanitary, and may inhibit the unscrewing process.

 Another type of closure employs a cap that is hinged to a body such that the cap may be pivoted relative to the body. The body may be coupled to a container by
20 threads disposed on an interior surface of the closure body and mating threads disposed on an exterior surface of the container neck. Some versions of the hinged closure include a deck covering the container opening except for a circular (in transverse cross section) pour or dispensing opening formed therein. A circular plug formed on the underside of the cap is insertable into a spout that is formed proximate the pour
25 opening upon closing of the cap relative to the body. Unfortunately, during normal

operation the plug contacts the container contents that are disposed proximate the pour opening upon closing. Thus, residue of the material contents adhere to the plug and are visible on the plug upon pivoting the cap relative toward its open position, which is unattractive and difficult to clean.

5 Containers having a hinged cap often have a liner that is disposed over the container opening to form a seal therewith. Typically, the closure is tightened before the liner is sealed to the container rim by induction welding or like process. Unfortunately, the induction welding process tends to loosen the closure such that, in some circumstances, the torque required to unscrew the closure is below a desired
10 value or near zero -- that is, the closure is loose. Further, the container liquid or semi-solid contents, or water used to wash the threads or container, often adheres to the threads of the container and closure during the filling process. The loose closure enables evaporated liquid from the thread area or from the ambient atmosphere to condense within the closure and collect on top of the liner. Thus, an end user may
15 encounter the condensed liquid upon removing the closure and before piercing or removing the liner, which is undesirable.

SUMMARY

20 A closure, according to an aspect of the present invention, is provided that includes a spout formed around an elongated orifice. A cap, which is affixed to a body of the closure via a hinge, includes a spout cover on its underside. The spout cover fits over the spout in sealing engagement therewith to form an outside seal -- that is, a seal disposed on an outside surface of the spout or otherwise not in contact with the
25 flowpath of the material contents during dispensing. The outside seal prevents or diminishes the contact between the seal and the material contents stored in the container and dispensed through the orifice.

Further, the outside seal formed by a pair of opposing beads or protrusions may be configured to provide a predetermined opening formed. A spud preferably is
30 disposed within, and spaced apart from, the spout cover such that the spout is received

therebetween. The spud is configured to urge, if necessary, the spout into contact with the spout cover to enhance or facilitate sealing. An annular seal extends downwardly from an underside of the closure to form a seal between a liner and the closure. The head-space above the liner that is enclosed by the container is sealed from the ambient atmosphere by the annular seal and by the sealing contact between the spout and spout cover.

According to an aspect of the present invention, the closure is capable of resealably closing a container and includes a closure body, a cap, and a hinge. The closure body includes a top deck, a skirt downwardly depending from a periphery of the top deck, an elongated orifice formed in the top deck, and a spout extending upwardly from the top deck substantially coextensive with the orifice. The skirt includes threads disposed thereon. The elongated orifice includes a length that is greater than its width.

The cap includes a lid member, a cap sidewall extending downwardly from a periphery of the lid member, and a spout cover extending downwardly from the lid member. An interior surface of the spout cover receives the spout therein, and the spout cover interior surface and an exterior surface of the spout form a sealing contact therebetween while the cap is in a closed position. Thus the sealing contact forms an outside seal relative to the spout.

The hinge is coupled between the body and the cap for enabling actuation of the cap relative to the body between an open position in which the spout cover is disengaged with the spout and the closed position in which the spout cover is engaged with the spout. In this regard, the orifice enables dispensing of container contents therethrough while the cap is the open position and the spout cover prevents dispensing of the container contents while the cap is in the closed position. The hinge is preferably a snap-action hinge.

According to another aspect of the present invention, the closure includes a continuous, annular seal extending downwardly from an underside of the deck. The annular seal forms a seal between the closure and a liner disposed between the closure and the container. Thus, the annular seal and the sealing contact, which is formed

between the spout and the spout cover, seal the head-space above the liner from water vapor and other gaseous infiltration.

According to yet another aspect of the present invention, the sealing contact is at least partly formed by at least one protrusion or bead on the spout or the spout cover.

5 Preferably, each of the spout and the spout cover have a protrusion or bead formed thereon. The spout cover bead extends inwardly from a spout cover interior surface and the spout bead extends outwardly from the spout exterior surface. Thus, the beads are opposing. The cover bead engages the spout bead to form sealing contact therebetween while the cap is in the closed position. Each of the beads may include an
10 upper surface, a lower surface, and a tip therebetween. Preferably the upper and lower surfaces are obliquely angled or rounded to facilitate sliding of the beads relative to one another.

BRIEF DESCRIPTION OF THE FIGURES

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Figure 1 illustrates a closure coupled to a container in a closed position according to the present invention;

Figure 2 is an enlarged top view of the closure shown in Figure 1 in an open (as-molded) position;

20 Figure 3 is a cross sectional view taken through a portion of the closure indicated by lines 3-3 in Figure 2;

Figure 4 is an enlarged cross-sectional view of a portion of the closure identified as area 4 in Figure 3;

25 Figure 5 is an enlarged cross-sectional view of a portion of the closure identified as area 5 in Figure 3; and

Figure 6 is a view of an interior portion of the closure in the fully closed position with most of the closure removed for clarity.

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DESCRIPTION OF A PREFERRED EMBODIMENT

The figures illustrate a preferred embodiment of the present invention.

According to a first aspect of the present invention, a container package 8 includes a
5 closure 10 that is coupled to a container 11, as best shown in Figure 1. Container
package 8 may be employed for packaging any contents capable of flowing, especially
viscous materials such as jellies, sauces, pastes, granular materials, and like substances.

As shown in relief in Figures 3 and 4, container 11 includes a container
sidewall 12 having a neck 14 that extends upwardly to a lip 18. Container threads 16
10 are formed on an exterior surface of neck 14. As shown in relief in Figure 4, a liner 19
is disposed on lip 18 over the opening in neck 14 to seal the contents of container 11.
Preferably, liner 19 is of the type that may be induction welded to lip 18, such as a
plastic liner with an foil layer. The present invention also encompasses the container
package 8 employing any liner material. Further, the container package 8 may employ
15 liners of other designs, and may forego a liner altogether. Container 11 may be formed
of any conventional material, including plastic and glass, and the present invention is
especially suitable for plastic containers having flexible sidewalls that enable squeezing
to urge the contents (not shown) to flow through the closure 10.

As shown in Figures 1, 2, and, 3, and according to another aspect of the present
20 invention, closure 10 includes a body 20 that is coupled to container 11, a cap 24, and a
hinge 28 coupled between body 20 and cap 24. Hinge 28 enables cap 24 to be
repeatably pivoted relative to body 20. Body 20 includes a generally cylindrical skirt
30 and a substantially circular top deck 32 that preferably is integrally formed with an
upper portion of skirt 30. Skirt 30 preferably includes plural serrations 46 disposed on
25 an exterior surface thereof to enhance gripping of closure 10 by a user, and closure
threads 48 disposed on an interior surface of skirt 30 that mate to threads 16 of
container 11, as shown in Figures 3 and 4. The terms "interior" and "exterior", and
"inward" and "outward", as used herein refer to relatively inwardly facing and
relatively outwardly facing (relative to a longitudinal centerline of container 11)
30 directions or orientations, unless the direction or orientation is specifically specified

otherwise.

Deck 32 includes a deck top surface 54 and a deck bottom surface 56. As best shown in Figure 4, an annular recess 52 is formed at a periphery of deck 32 and includes a shoulder portion 53a and a substantially flat seating surface 53b. Preferably, shoulder portion 53a and seating surface 53b are configured such that recess 52 is a notch, in longitudinal cross section. Thus, in longitudinal cross section, seating surface 53b is substantially horizontal and shoulder portion 53a may be substantially vertical to form an approximate cylinder, or may be angled slightly radially inwardly to form an approximate frustum of a cone. The present invention encompasses other configurations of the portion of deck 32 that interfaces with cap 24 in the closed position, as will be apparent to persons familiar with closure configurations.

An orifice 50 is formed through deck 52 between top surface 54 and bottom surface 56 to enable dispensing of the contents from an interior of container 11. As shown in Figure 2, orifice 50 has a length L1, which is measured along its longitudinal axis A1, that is greater than its width W1, which is measured transverse to longitudinal axis A1. Orifice 50 is shown in the figures as a slot having, in plan view as shown in Figure 2, a pair of substantially parallel sidewalls with semi-circular or rounded ends. The present invention is not limited to such a configuration, and encompasses an orifice in the shape of an ellipse, oval, and the like. For dispensing jelly, or a similarly viscous product, from a container that is capable of being deformed by squeezing, the L1 and W1 dimensions are preferably about 1.0 inches (25.4 mm) and 0.16 inches (4.0 mm), respectively. An orifice having such dimensions may dispense the contents through orifice 50 in a ribbon approximately one inch wide.

As partially shown in Figure 4, deck bottom surface 56 is formed to provide a smooth radius portion 57 around the lower perimeter of orifice 50 to enhance the flow of the material contents. A spout 58 extends upwardly from top surface 54 about orifice 50. Preferably, spout 58 has a spout sidewall 60 that preferably has a uniform height H above top surface 54 of between 3 and 4 mm (1.2 and 1.6 inches). Preferably, sidewalls 60 are substantially vertical and opposing portions of sidewalls 60 and 70 are mutually parallel, as shown in Figures 3 and 4. The present invention also

encompasses sidewalls that are angled inwardly at the top or bottom of orifice 50 (which configuration is not shown) and therefore encompasses sidewalls that are not mutually parallel.

Spout sidewall 60 includes an interior surface 62a, an opposing exterior surface 62b, and a distal rim 62c therebetween. A protrusion or bead 63 extends radially outwardly from exterior surface 62b, and preferably extends entirely around the perimeter of spout wall sidewall 60 and orifice 50. Spout bead 63 may be formed of any geometry, and preferably is defined, in longitudinal cross section as shown in Figure 4, by an upper surface 64a, an opposing lower surface 64b, and a distal tip 64c disposed between surfaces 64a and 64b.

Preferably surfaces 64a, 64b, and 64c form smooth contours without sharp edges or transitions. In this regard, tip 64c may be, in longitudinal cross section, a rounded portion below a substantially flat, inclined (relative to the sidewalls of surfaces 62a or 62b) upper surface 64a such that rounded tip portion 64c smoothly yields to upper surface 64a. Further, lower surface 64b preferably is short compared to upper surface 64a such that tip 64c smoothly merges with the sidewall of exterior surface 62b. The present invention is not limited to the contours described herein, but rather encompasses any spout bead contours or any sealing means, even a spout that altogether lacks protrusions or beads like those described herein, as will be understood by persons familiar with closure and sealing technology. For example, surfaces 64a, 64b, and 64c may define a continuously curved or bulbous protrusion or bead.

As shown in Figures 2 and 3, cap 24 includes a substantially cylindrical sidewall 36 and a substantially circular lid member 38 that is integrally formed with an upper end of sidewall 36. Lid member 38 has an underside 39 and an opposing top side 41. The terms "upper" and "lower", as used herein with respect to cap 24, refer to the orientation with cap 24 in its as-molded position shown in Figures 2 and 3. Cap 24 is inverted from its position shown in Figure 3 to form its closed position, which is shown in Figures 1 and 6. A thumb tab 42 extends outwardly from a periphery of sidewall 36. In this regard, as shown in the right portion of Figure 3, a spout cover 40 extends upwardly from an underside of lid member 38 and has a shape that

generally matches that of spout 58. As best shown in Figure 5, spout cover 40 is formed by a cover sidewall 70 having an interior surface 72a, an opposing exterior surface 72b, and a rim 72c formed therebetween.

A cover protrusion or bead 73 extends radially inwardly, relative to spout cover 40, from interior surface 72a, and preferably extends entirely around the perimeter of spout cover sidewall 70. Spout cover 40 preferably is configured to fit over and outside of spout 58, as described more fully below. Therefore, as shown in Figure 2, spout cover 40 will have an internal length dimension L2 along its longitudinal axis A2 that is approximately equal to orifice length L1 plus twice the width of spout sidewall 60, and an internal width dimension W2 that is approximately equal to orifice width W1 plus the twice the thickness of spout sidewall 60.

Spout bead 73 may be formed of any geometry, and preferably is defined, in cross section, by an upper surface 74a, an opposing lower surface 74b, and a distal tip 74c disposed between surfaces 74a and 74b. In this regard, tip 74c may be, in longitudinal cross section as shown in Figure 4, a rounded portion below a substantially flat, inclined (relative to the sidewalls of surfaces 72a or 72b) upper surface 74a such that rounded tip portion 74c smoothly yields to upper surface 74a. Further, lower surface 74b preferably is short compared to upper surface 74a such that tip 74c smoothly merges with the sidewall of interior surface 72a. The present invention is not limited to the contours described herein, but rather encompasses any spout cover bead contours or any sealing means, and even a spout cover that altogether lacks beads like those described herein, as will be understood by persons familiar with closure and sealing technology. For example, surfaces 74a, 74b, and 74c may define a continuously curved or bulbous protrusion or bead.

Closure 10 preferably also includes a spud 75 that extends upwardly from an underside of lid 38 and is encompassed within spout cover 40. Spud 75 preferably is formed in a shape that is substantially the same as spout cover 40, such as a continuous oval or slot-shape as is shown in the Figures, and is uniformly spaced apart from spout cover 40. Spud 75 preferably includes an inner surface 77a, an opposing outer surface 77b, and a rounded or beveled tip 77c therebetween. Thus, spud 75 and spout cover 40

define a space 79 therebetween capable of receiving the spout 58, as described below. Further, spud 75 preferably has a height that is less than that of spout cover 40.

The present invention encompasses embodiments that do not include spud 75, as will be understood by persons familiar with closure technology. Further, the invention encompasses providing a spud 75', as shown in phantom in Figure 6, that extends upwardly from top deck 32 and that contacts spout cover outer surface 74a.

As best shown in Figure 2, hinge 28 includes a first end 76a that is integrally coupled with skirt 30 and an opposing second end 76b that is integrally coupled with cap 24. Preferably, hinge 28 is a flexible web that forms a snap hinge, as disclosed in United States Patent Number 6,152,320, which is assigned to the assignee of the present invention and incorporated herein by reference in its entirety. The present invention is not limited to snap hinges, but rather encompasses any hinge that couples cap 24 with body 20.

Figures 1 and 6 illustrate the closure 10 in a closed position in which cap 24 is engaged with body 20. In the closed position, a portion of cap sidewall 36 is disposed in the notch 52 formed by shoulder portion 53a and seating surface 53b. Preferably, the internal radius of the cap sidewall 36 is several thousandths of an inch larger than the radius of shoulder portion 53a to enable cap 24 to slide into and out of notch 52. Preferably, a distal rim or tip of cap sidewall 36 contacts seating surface 53b in the fully closed position.

Further, spout cover 40 is disposed over and around spout 58 to form a seal therewith while cap 24 is in its fully closed position. Spout 58 is disposed in gap 79 such that exterior surface 77b of spud 75 may contact spout interior surface 62a. Thus, spud 75 may urge spout 58 outwardly against spout cover 40 to enhance the sealing contact between sealing surfaces 62b and 72a and protrusions 63 and 73, which is described more fully below. Gap 79 may be sized to receive spout 58 and include a clearance to aid insertion of spout 58 therein. Alternatively, gap 79 may be sized to tightly receive spout 58 without clearance or with a slight interference fit.

Employing spud 75, as described herein, is preferred because it enhances the sealing contact between spout 58 and spout cover 40 and provides the desired lift force

for opening the closure. Further, spud 75 may conform spout 58 to the desired slot-like shape (or other desired shape) in circumstances in which spout 58 would tend to be misshapen upon manufacture. For example, the opposing sidewalls 60 of spout 58, because of their configuration, may tend to deform inwardly after molding from their as-molded, parallel orientation to a slight hourglass shape (in transverse cross section). The short height relative to spout 58 and spout cover 40 reduces such deformation of spud 75 upon molding. Spud 75 urges sidewalls 60 to their parallel relationship (or other desired, as-molded shape). Spud 75 is especially effective in this regard when closure 10 is placed to its closed position shortly after molding and prior to most of the shrinkage, which occurs after molding.

Preferably, each one of spout 58, spout cover 40, and spud 75 are continuous and coextensive. That is, the overall shape (in transverse cross section) and size of spout sidewall exterior surface 62b are substantially the same as the shape and size of cover sidewall interior surface 72a; and the shape (in transverse cross section) and size of spout sidewall interior surface 62a are substantially the same as the shape and size of spud exterior surface 77b. Thus, spout 58 fits within spout cover 40 and forms sealing contact therebetween, and spud 75 fits within spout 50 to enhance the sealing contact.

As shown in Figure 6, while cap 24 is in the fully closed position, spout cover 40 is engaged with spout 58 to form the sealing contact therebetween such that cover bead 73, and particularly cover bead tip 74c, contacts spout sidewall exterior surface 62b and such that spout bead 63, and particularly spout bead tip 64c contacts cover sidewall interior surface 72a. In this regard, spout 58 and spout cover 40 are preferably molded such that there is light contact between tip 74c and surface 62b and between tip 64c and surface 72a. Further, because spud 75 preferably has a height that is less than that of spout cover 40, spout 58 is able to disengage spud 75 prior to disengaging spout cover 40 during the opening of cap 24, as described below.

The dimension between longitudinal centerline A1 and the spout sidewall exterior surface 62b is approximately equal to the dimension between centerline A2 and the inward surface of spout cover tip 74c, and/or the dimension between longitudinal centerline A1 and the outward surface of spout bead 73 is approximately

equal to the dimension between centerline A2 and spout cover interior surface 72a.

Alternatively, spout 58 and spout cover 40 may be molded such there is an interference fit therebetween -- that is, the dimension between longitudinal centerline A1 and spout sidewall exterior surface 62b is greater than the dimension between centerline A2 and inward surface of spout cover tip 74c, and/or the dimension between longitudinal centerline A1 and the outward surface of spout bead 73 is greater than the dimension between centerline A2 and spout cover interior surface 72a. Sidewalls 60 and 70 may be configured to flex or deform slightly inwardly or outwardly so as to enable bead 73 to move past bead 63 during opening and closing of cap 24. In this context, the orientations inward and outward are relative to longitudinal centerlines of spout 58 and spout cover 40.

Closure 10 may be configured to require a predetermined opening force, which preferably is in the range of 1 to 7 pounds (0.45 to 3.2 kg), depending on the design parameters and preferences of the designer. The opening force may be determined by the configuration and location of beads 63 and 73, sidewalls 60 and 70, spud sidewall 77b, orifice 50, and like features, as will be understood by persons familiar with closure technology. Thus, the sealing contact between spout 58 and spout cover 40 (among other features) provides the combination of an effective seal around orifice 50 and an opening force within the desired range.

Figure 6 shows that spout bead lower surface 64b is slightly spaced apart from cover bead lower surface 74b. The present invention encompasses lower surfaces 64b and 74b being in contact while cap 24 is in the closed position, as well as being spaced apart farther than is shown in Figure 6. Further, rim 62c of spout 58 may contact the underside surface 39 of cap 24, and/or rim 72c of cover 40 may contact deck top surface 54 while cap 24 is in its closed position. Spout cover bead 73 is disposed below spout bead 63, thereby inhibiting cap 24 from moving upward relative to body 20 so as to retain cap 24 in its closed position.

Hinge 28 may provide a small force urging cap 24 toward the open position to bias cover bead lower surface 74b toward and against spout bead lower surface 64b.

The contacts between tip 74c and surface 62b and between tip 64c and surface 72a, and

preferably also bead surfaces 64b and 74b, preferably are continuous around the entire periphery of spout 58. However, the present invention encompasses discontinuous sealing contact.

Thus, according to an aspect of the present invention, the sealing contact
5 between spout 58 and spout cover 40 form an outside seal that is disposed on the exterior surface of the spout sidewall 60 and is spaced apart from the rim 62c of spout 58. In this regard, during normal dispensing of the material contents from container 11 through orifice 50, the material contents do not come into contact with the sealing contact area that is defined between the spout exterior surface 62b and the spout cover
10 sidewall 72b. Therefore, during normal dispensing of the contents from the container package, the sealing contact between the spout 58 and the spout cover 40 is spaced apart from the contents and does not become sullied thereby.

According to another aspect of the present invention, as shown in Figures 3 and 5, an annular closure seal 80 is formed on an underside of deck 32 such that a body 82
15 of seal 80 protrudes downwardly from deck bottom surface 56. As best shown in Figure 5, closure seal 80 includes a pointed annular protrusion 82 that extends downwardly from body of 84. Protrusion 82 preferably is continuous to form an unbroken circle in transverse cross section. An edge 86 of body 82 may form an acute angle, in longitudinal cross section as shown in Figure 5.

For clarity, Figure 5 shows closure 10 in an un-torque position such that seal 80
20 is in light contact with liner 19. Upon tightening of closure 10 onto container 11, the point or tip of protrusion 82 may deform a portion of liner 19 so as to form a seal therebetween. Edge 86 may also contact liner 19 to form or to enhance the seal. Seal 80 may, thus, prevent liquid in the thread area from splashing onto the top surface of
25 liner 19 or from running onto the top surface of liner 19 upon inversion of container package 8 or upon washing.

Further seal 80 may prevent or inhibit water vapor from entering the head-space, which is above the liner 19 and below deck 32, and condensing therein. The sealing contact between spout 58 and spout cover 40 also inhibits water vapor from
30 entering the head-space. Thus, seal 80 and the sealing contact between spout 58 and

spout cover 40 substantially eliminate or diminish the problem of water condensation on the top of liner 19.

To open container package 8, a user may grasp container neck 14 with cap 24 in the closed position, as shown in Figure 1, in which tip 74c and surface 62b, tip 64c and surface 72a, and spud exterior surface 77b and spout interior surface 62a are in contact. The user may urge thumb tab 42 upwardly to urge cover bead lower surface 74b against spout bead lower surface 64b. Because spout cover 40 extends below spud 75, as shown in Figure 6, during the opening process spud 75 disengages with spout 58 while tip 74c and surface 62b, and tip 64c and surface 72a, are in contact. Thus, spout 58 preferably is not inwardly constrained by spud 75 while tips 74c slides past tip 64c, thereby facilitating inward flexing or deforming of spout 58. Each of the surfaces 64b and 74b are rounded or inclined to facilitate mutual sliding in response to upward urging of thumb tab 42 until cover bead tip 74c slips upward past spout bead tip 64c.

Cap 24 continues to rotate relative to body 20 by continued urging of thumb tab 42 and/or by the action of snap hinge 28 until it reaches its rest-open position, which is likely be less than 180 degrees from its fully closed position, according to the configuration of hinge 28. The position of cap 24 relative to body 20 shown Figures 2 and 3 is the position in which closure 10 is molded, and may not represent the rest-open position of cap 24.

Upon cap 24 being disposed in its rest-open position, the user may invert container package 8 to dispense the material contents through orifice 50. For containers with flexible sidewalls, the user may squeeze the container sidewalls to urge the material contents through orifice 50. The elongated shape of orifice 50 provides greater open area through which material contents may pass.

The user may urge cap 24 toward deck 32 to pivot closure 10 from its open position to toward its closed position. Hinge 28 may also urge cap 24 toward its closed position upon reaching its snap action point. The orifice being spaced apart from a center of deck 32, as best shown in Figure 2, enables spout cover 40 to clear spout 58 during pivoting about hinge 28. To move cap 24 into its fully closed position, the user may urge cap 24 downwardly such that the distal rim of cap sidewall 36 moves past the

rounded portion of shoulder portion 53a. Further, spout cover bead upper surface 74a (which is the leading surface of bead 73 because cap 24 is in an inverted position from its molded state) may contact spout bead upper surface 64a.

5 A user applies force downwardly on cap 24 such that cover bead upper surface 74a slides relative to spout bead upper surface 64a. Spout cover sidewall 70 and/or spout sidewall 60 deform or deflect relative to one another until cover bead tip 74c is urged downwardly past spout bead tip 64c. Spout tip 62c may contact spud tip 77c such that spout 58 is urged against spout cover 40. As cover bead lower surface 64b comes into contact with spout bead lower surface 74b such that cap 24 reaches its fully
10 closed position, cap sidewall rim 62c may contact seating surface 53b.

Embodiments closure and container assembly disclosed herein been employed to illustrate aspects of the present invention. The scope of the present invention, however, is not limited to the particular embodiments discussed herein, but rather encompasses other embodiments that will be apparent to persons familiar with closure
15 technology in view of the present disclosure. For example, the present invention encompasses closures that are coupled to the container integrally or by a snap feature, as distinguished from the threads shown in the figures, closures that are oval or otherwise non-circular in transverse cross section, closures having hinges that are different from that described herein, or those entirely foregoing hinges, and the like.
20 Thus, the scope of the invention may be ascertained by reference to the claims.